1. The point $P$ is any point on the circle with center $O$. Perpendicular lines are drawn from $P$ to perpendicular diameters, $\overline{AB}$ and $\overline{CD}$, meeting them at points $F$ and $E$, respectively. If the diameter of the circle is 8, what is the length of $EF$?

2. Find all pairs of prime numbers whose sum equals 999.

3. Suppose you had a job where you received a 10% raise. Because business was falling off, the boss was soon forced to give you a 10% cut in salary. Will you be back to your starting salary?
4. Factor the following polynomials: (hint: use graphing calculator)
   
   a. \( x^2 - 7x + 10 \)  
   b. \( 20x^2 + 53x - 51 \)  
   c. \( 12x^2 - 4x - 21 \)  

5. Parallel and Perpendicular Lines  
   Show whether or not \( \overrightarrow{AB} \) is parallel to \( \overrightarrow{CD} \). Where: \( A(-9, -5), B(6, 5), C(-6, -9), D(0, -5) \).  

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   Line AB
   Linear Regression (ax+b)
   \( \text{regEQ}(x) = .666667x + 1. \)
   \( a = .666667 \)
   \( b = 1. \)
   \( r = 1. \)
   \( r^2 = 1. \)

   Line CD
   Linear Regression (ax+b)
   \( \text{regEQ}(x) = .666667x + -5. \)
   \( a = .666667 \)
   \( b = -5. \)
   \( r = 1. \)
   \( r^2 = 1. \)
6. Show whether or not $\overrightarrow{PQ} \perp \overrightarrow{RS}$. Where: $P(5,-3)$, $Q(0,-7)$, $R(4,-2)$, $S(8,-7)$.

7. Find the probability of rolling at least 3 sixes in 5 rolls of a die.
   Success on each trial:
   $n =$ Number of trials:
   $r =$ Number of successes:
   $p =$ Probability of each success:
   $q =$ Probability of each failure:

   Formula: $\binom{n}{r} p^r q^{n-r}$

   $\text{sum(seq(5 nCr x * (1/6)^x * (5/6)^(5-x),x,3,5))}$
8. On a 30-question multiple-choice test a student must choose the best answer from 4 possible answers. What is the probability the student gets at least 60% right by guessing?

9. When driving from home to work, a driver had an average speed of 30 mph. When driving from work to home the driver averaged 60 mph. What was the average speed for the round trip?

10. While rowing his boat upstream, a man drops a cork overboard and continues rowing for 10 more minutes. He then turns around, chasing the cork, and retrieves it when the cork has traveled 1 mile downstream. What is the rate of the stream?